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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/711,324	11/13/2000	Kei-Yu Ko	3526.4US (97-1136.4)	7008
24247	7590	02/17/2004	EXAMINER	
TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110			CHEN, KIN CHAN	
			ART UNIT	PAPER NUMBER
			1765	

DATE MAILED: 02/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/711,324

Applicant(s)

KO ET AL.

Examiner

Kin-Chan Chen

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4,5 and 7-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5 and 7-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 0104.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claims 1, 2, 4, 5, and 7-46 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed.

Newly amended claims 1 and 20 contain several new matters. For example, "consisting essentially of" excludes other materials which is not recited in the specification.

Any exclusionary provision must have basis in the original disclosure. The mere absence of a positive recitation is not basis for an exclusion. Any claim containing a negative limitation which does not have basis in the original disclosure should be rejected under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement. Note that a lack of literal basis in the specification for a negative limitation may not be sufficient to establish a prima facie case for lack of descriptive support. *Ex parte Parks*, 30 USPQ2d 1234, 1236 (Bd. Pat. App. & Inter. 1993).

"A consisting essentially of claim occupies a middle ground between closed claims that are written in a consisting of format and fully open claims that are drafted in a comprising format." *PPG Industries v. Guardian Industries*, 156 F.3d 1351, 1354, 48 USPQ2d 1351, 1353-54 (Fed. Cir. 1998). **When an applicant contends that additional steps or materials in the prior art are excluded by the recitation of "consisting essentially of," applicant has the burden of showing that the introduction of additional steps or components would materially change the characteristics of applicant's invention.**

Newly amended claim 18 (lines 3-4) is new matter.

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2. Claims 1, 2, 4, 5, and 7-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims do not clearly set forth the metes and bounds of the patent protection desired. In claims 1 and 20, the close-ended transitional phrase "consisting essentially of" is used, and however, in dependent claims (e.g., claims 8, 9, 11), the open-ended transitional phrase "comprises" is used. As such, a person of ordinary skill in the art could not interpret the metes and bounds of the claims. For the patent examining purpose, the examiner interprets the claims are all **open-ended** in light of the specification.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, 4, 5, and 7-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ding et al. (US 5,814,563) in view of Bosch et al. (US 5,626,716).

Ding teaches that a substrate may have a dielectric layer (e.g., doped (e.g., BPSG) and undoped silicon dioxide (e.g., TEOS)), see col. 1, lines 19-21. The substrate may be etched using a fluorohydrocarbon gas selected from the group consisting of CH₃F, CHF₃, C₂HF₅, C₂H₂F₂, and C₂H₄F₂ (col. 2, lines 62-64). Therefore, it would be

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obvious to one skilled in the art that CHF_3 and $\text{C}_2\text{H}_4\text{F}_2$ are **equivalent**, containing similar etching characteristics, substitution of one for the other for etching dielectric layer would have anticipated to produce an expected result. The above $\text{C}_2\text{H}_4\text{F}_2$ reads on the limitations of "comprising $\text{C}_2\text{H}_x\text{F}_y$, where x is an integer from 3-5, y is an integer from 1 to 3 and $x + y = 6$ " in the instant claims. The dielectric layer may comprise plurality of layers. (col. 3, lines 54-62). The etching process provides high etching rates and good etching selectivity ratios (col. 2, lines 22-35).

Unlike the claimed invention, Ding does not explicitly state that the dry etchant may be formulated to etch doped silicon dioxide with selectivity over (or at faster rate in instant claim 20) at least undoped silicon dioxide. In plasma etching of semiconductors, Bosch teaches that it is known that in dry etching process, the doped silicon oxide (such as the addition of the boron and phosphorous to the oxides) is etched at a faster rate than undoped silicon oxide (col. 2, lines 9-12). In addition, Bosch teaches a process for selectively etching a structure comprising doped silicon dioxide. The structure may be exposed to a fluorohydrocarbon etchant such as CHF_3 . The structure may be removed down to an etch stop adjacent the structure and comprising undoped silicon dioxide. The removing may take place without substantially removing the etch stop (col. 2, lines 37-43; col. 4, lines 44-48). As stated above, because Ding shows that CHF_3 and $\text{C}_2\text{H}_4\text{F}_2$ are **equivalent**, containing similar etching characteristics, substitution of one for the other for etching dielectric layer would have anticipated to produce an expected result. Therefore, one skilled in the art at the time of the invention would have found it obvious

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to modify Ding by using the principles of Bosch to formulate the etchant of Ding (such as $C_2H_4F_2$ and others as additives) in order to provide required etching selectivity ratios.

The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution. *Ex parte Novak* 16.

USPQ 2d 2041 (BPAI 1989); *In re Mostovych* 144 USPQ 38 (CCPA 1964); *In re Leshin* 125 USPQ 416 (CCPA 1960); *Graver Tank & Manufacturing Co. v. Linde Air Products Co.* 85 USPQ 328 (USSC 1950).

Substitution of known equivalent structures. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971).

As to claim 2 and 21, Bosch teaches doped silicon dioxide with selectivity over silicon nitride (col.2, lines 37-39). For the same discussion above, the etchant of Ding may be formulated to do so.

As to claims 4,5, 7 and claims 22-26, Ding teaches these features (see col. 6, lines 1-14).

As to claims 8, 13, 27 and 32, Ding teaches using CH_2F_2 and CH_3F (col. 6, lines 1-14).

As to claims 9, 11, 16, 28, 30 and 35, Ding teaches using CF_4 and CHF_3 (col. 6, lines 1-14).

As to dependent claims 42 and 46, Ding teaches using carrier gas (inert gas).

Claims 10, 12, 14, 15, 17, 18, 19, 29, 31, 33, 34,36-41, 43-45 differ from the prior art by specifying various compositions or concentrations. However, the same materials

are used and the process is alike. It is the examiner's position that a person having ordinary skill in the art at the time of the claimed invention would have found it obvious to modify Bosch and Ding by using various compositions and different concentrations because same were known to be result-effective variables, and routine experimentation would have been expected to optimize them.

Response to Arguments

5. Applicant's arguments filed on January 2, 2004 have been fully considered but they are not persuasive.

Applicant has argued that using new transitional phrase "consisting essentially of" in the claims do not materially affect the basic and novel characteristics. In fact, relative etching rate and etching selectivity of two materials (such as doped and undoped materials) would have been affected. Specifically, some examples in the specifications. For example, on page 10, lines 14-16, applicant describes the etchant may use $C_2H_xF_y$ with CF_4 or CHF_3 or both, and may add one or more other additives that alter the various characteristics of etchant.

Applicant has argued claim 18 with the support of page 9, lines 19-22. However, It is still not clear description of claim 18. Therefore, claim 18 (lines 3-4) is new matter as stated in the previous office action (September 22, 2003).


Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (571) 272-1461. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

February 9, 2004


KIN-CHAN CHEN
PRIMARY EXAMINER